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ABSTRACT

A full investigation into how and why the expression of potential benefits of computers in schools is hindered would need to consider many aspects, but one point that should be considered is the ever-tightening integration of educational institutions into the global economy. Evidence of the accelerating assimilation of schools into the economy exists on many levels. Equating schooling with production of a labor force and involvement of the business community in educational policy are not new developments. Some innovations incorporating schools into the economy are quite novel, such as the contracting by private companies to operate public schools and the Channel One commercial news channel for school use. This economic influence on schooling is providing a context in which the introduction of computers into the schools is being played out in a way unlikely to realize their potential for educational improvement. Cybernetics, which is really about stability and adherence to present goals, is desirable in many cases in business, but less so in schools. Cyborgs, cybernetic organisms that represent the symbiosis of technology and biology, have been represented in fiction and films. Increasing social control through cybernetics may result in a view of the student as cyborg. In such circumstances, the beneficial use of computers in education is by no means guaranteed. (SLD)

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Do Cyborg Dreams Emancipate Sheep?

(with apologies to Philip K. Dick)

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a paper presented at the Bergamo Conference on Curriculum Theory and Practice, Dayton, October 1992, as part of a panel entitled "Students are Cyborgs, Sessions are Cybernetic, and Titles are Tentative"

> *My cyborg myth is about transgressed boundaries, potent fusions, and dangerous possibilities which progressive people might explore as one part of needed political work.*
>
> -- Donna Haraway

> *By detaching the cyborg model from its present institutional context, into the realm of phantasy, [Haraway's] discussion can help us to analyse its manifestation in popular culture. Yet that detachment can also lead us away from confronting the social impotence that makes the phantasy appealing.*
>
> -- Les Levidow and Kevin Robins

Today is October 3rd. It's been a bad week. Wednesday night I watched the film "Bob Roberts," a chronicle of the idiocy of American elections, and a frighteningly plausible depiction of public manipulation. Thursday I joined a large crowd of Madison residents to watch Al Gore and Bill Clinton portray themselves as champions of the downtrodden, just itching to upend the nation's power structure. Don't get me wrong, I am glad that 30,000 in a city of only 190,000 bothered to attend *any* political event, and I do fervently hope that Clinton wins the election, but I harbor no illusions about what Bill Clinton wants, and 30,000 hardly compares with the crowd of 72,000 who this afternoon not only bothered, but paid, to attend a University of Wisconsin football game. This morning, my *New York Times* included the following items: five Turkish sailors were killed when a U.S. aircraft carrier accidentally fired a missile at their vessel. "Navy and NATO officials were trying to determine how a weapon that is designed to shoot down enemy missiles could have been fired at an allied ship... officials said they were baffled as to how the complex firing sequence for anti-missile missiles could have been initiated when no missile launch was planned." A Senate subcommittee has accused the Justice Department's director of prisons of acting for political reasons when, four days before the 1988 election, he prevented an inmate who claimed to have sold marijuana to Dan Quayle from meeting with reporters, and ordered the man detained in solitary confinement until after the election. New figures indicate a loss of 57,000 jobs during the month of September; the unemployment rate nonetheless shrank by one-tenth of a percent as more people gave up looking for work. The Bush campaign has forthwith begun running an advertisement publicizing the drop in unemployment. An op-ed column by a 38-year-old single woman with no health insurance, who became pregnant when her birth control failed and would like to raise the child, described the impossible economic situation she faces; she even looked into welfare, but "it turned out that even with food stamps I wouldn't be able to live on it. The social worker I spoke to said that most women on welfare have some income off the books and live with family members," which in her case is not an option. Finally, the House of Representatives failed yesterday to override President Bush's veto of a bill reversing the gag rule.

What does this conjunction of depressing circumstances tell us, apart from perhaps helping to explain why this paper is so peevish? The accidental missile firing is a reminder that computers are

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dangerous objects, and relying on computers in critical situations is particularly dangerous. The catalog of Bush administration iniquities is a reminder of who holds power in this country and who doesn't. The arrogance all camps display in spouting blatantly absurd electoral rhetoric is a reminder of the dreadful state of civic discourse. And that they can do so with impunity is a reminder of profound public disengagement from public affairs. In short, we live in ugly times, efforts to disrupt the status quo face considerable obstacles, and computers may just as well hinder as help.

Like many others, I've found Donna Haraway's image of the cyborg a very powerful figure through which to explore the fancies and fixations of present intellectual and political culture(s). Wherever new technologies come into contact with existing institutions, multiple possibilities exist. I would hope to follow Haraway's example of seeking the "dangerous possibilities" latent in contemporary cultural forms. But, under the present circumstances, I also wonder about the difficulties of realizing those more promising possibilities. I wonder about how effectively existing social relations may promote certain new possibilities and foreclose others.

One site where we can observe this process, where we can watch powerful institutions appropriate new technologies so as to further entrench their own dominance, thereby thwarting the realization of progressive possibilities, is the integration of computing technology into the schools, an encounter the four of us are exploring today under the rubric "student as cyborg." A full investigation into how and why expression of the potential benefits of computers is hindered would need to consider the various agendas of, and forces acting on, all the different agents active in this particular setting: students, their parents, teachers, administrators, public officials, suppliers of hardware and software, policy think-tanks, etc. But for today I'd like to focus on one aspect of this problem, one which is raised in David Shutkin's paper.

David observes that the contemporary drive for "school restructuring" is in part a response to shifts in the social relations of work, and an effort to enact corresponding shifts in schooling so as to produce a labor force suited for current working conditions. I want to suggest that the phenomenon David describes is in fact part of another, broader, development he also alludes to: the ever-tightening integration of educational institutions into the global economy.

Evidence of the accelerating assimilation of schools into the economy exists on many levels. The practice David notes of equating schooling with the production of a labor force is, of course, not new - an earlier generation of reformers rallied to the banner of "manpower" planning (a label whose loathsome gender politics are replicated in slightly more subtle form by today's reformers). And outspoken involvement of the business community in various bodies making public recommendations on educational policy is also a time-honored, well-established practice. But other recent innovations incorporating schools into the economy are actually quite novel. Several cities have now contracted with private companies to operate individual schools, or entire districts. Plans are underway for the Edison Project, a nationwide network of *for-profit* private schools. And the parent company of that venture, Whittle Communications, has also brought us Channel One, the satellite-delivered news program carrying paid advertisements, notable for converting students themselves into a commodity, as Whittle sells its sponsors access to its captive audience. One could also interpret the current push for national testing as another example of viewing schools as economic entities: it's a "quality control" mechanism meant to standardize the output of the educational process.

Why this escalation of a longstanding practice should be occurring now is not entirely clear, but I imagine it has something to do with shrinking opportunities for extracting profit from locations outside

the United States. American businesses face strengthened competition abroad, a debt crisis in areas of the world that have traditionally been utilized to subsidize the U.S. economy, and gradually sharpening environmental constraints, both from regulatory action and from the manifest exhaustion of the planet's capacity to tolerate industrial recklessness. It seems a predictable response to this general depletion of opportunities abroad that there should an intensification of the search for domestic profits, with all social institutions, including education, being scrutinized for their potential contributions to improving the bottom line.

Whatever the reason for this economization of schooling, it does provide the context in which the introduction of computers into schools is being played out. And under these conditions, the exciting opportunities that *might* be generated by the creation of new technologies, and of new ways of thinking about technology - i.e., the "potent fusions" envisioned by Donna Haraway, and the "heretical cyborg possibilities" described in Matthew Weinstein's paper - are, I fear, unlikely to materialize.

David's paper shows how school restructuring involves the absorption of information technology by schools. I want to add that restructuring is equally about the absorption of educational institutions themselves into a larger, subsuming "information technology." While miniature cybernetic systems are injected into schools, the educational establishment is injected into the vast cybernetic system of our economy.

What does it mean to call something a "cybernetic" system? The founder of the field of cybernetics, MIT mathematician Norbert Wiener, called it "the science of communication and control." He derived the term from the Greek word for helmsman, because it's all about control. The basic idea is to study systems of various kinds - mechanical, biological, social - through the similarities in how they're controlled. Cybernetics views any control mechanism, whether it's controlling voltage levels, hormone levels, or employment levels, as a matter of communication, as a collection of messages exchanged among the various elements of a system. A study of how a system controls its behavior then becomes simply a study of the information content of these messages. Systems as diverse as an electrical circuit, a human body, or an entire population, are reduced to abstractions representing their internal information flow, so that the mathematics of information science can be applied equally to each of them. Systems having analogous patterns of internal communication are, in effect, seen as identical. All for the purpose of better understanding mechanisms of control.

Now Wiener himself was very conscious of the dangers of treating machines as humans, and eloquently criticized reckless reliance on technology in situations demanding human judgment. He warned as well against treating humans as machines, assailing the crass instrumentalism of regarding people as manipulable and disposable components of some encompassing system. For these efforts, and for his rejection of Defense Department research support, Wiener's name has become synonymous with social responsibility in the scientific community. But his successors have often been less troubled by such hazards. I imagine Wiener would be appalled but not surprised to learn that a Navy missile, entrusted to an automated firing system, had inadvertantly torn through the bridge of another ship, nor that an incumbent President would respond so calculatingly to the loss of 57,000 jobs.

The term "cyborg," short for "cybernetic organism," clearly has connotations very unlike those of its precursor, "cybernetic." As developed by Haraway and others, the fusing of mechanical and organic embodied by the cyborg, the symbiosis of technology and biology, has come to represent border-crossings, unanticipated juxtapositions with unpredictable results, refusal of fixed identities, and transgressive behavior of all sorts. Cybernetics itself could hardly be more antithetical. It is precisely - in the

interest of control - about predictability, rule-governed behavior, and stable identities. Here there is no open-ended proliferation of possibilities. Cybernetic control does depend on a peculiar form of autonomy, but one that is thoroughly subordinated to predetermined, top-down goals.

An example may help. The classic illustration of cybernetic principles is the use of feedback as a control mechanism. A system utilizes feedback when information regarding the effects of its action is "fed back" through some sensory apparatus and influences its future actions. Wiener offers the example of a motorized anti-aircraft gun which swings more or less freely depending on the temperature. Since moving the gun to a desired position will require different amounts of force under different conditions, it's customary, he says, to build in a feedback mechanism that senses the gun's actual motion and adjusts the motor accordingly. Wiener says something equivalent happens when a person drives a car: the amount of force it takes to steer varies with the car's speed, its weight, road conditions, etc. People actually steer by observing the car's movement, and making repeated incremental adjustments to maintain the desired direction of travel. In both cases, there's a limited sort of autonomy. Drivers don't rigidly follow an exhaustive set of rules for exactly how far to turn the steering wheel under what conditions, nor do motorized guns. Both systems self-sufficiently modify their own behavior so as to achieve the desired result. This autonomy is strictly in service of predetermined goals. There is self-direction, but only in the interest of ensuring more, not less, stability.

That's what cybernetics is about. Stability and adherence to preselected goals. And in certain domains, that's highly desirable. I appreciate the fact that my local electric company's power distribution equipment knows, without human intervention, how to maintain a constant voltage at my wall socket no matter how many kilowatts my neighbors are using, and I'm glad that my body's temperature regulators are autonomous enough to unleash my sweat glands when I'm out for a run in August, yet won't spontaneously do so when I'm standing at a bus stop in January. But I'm much less enamored of this kind of control mechanism being applied to my local school district. I said earlier that school restructuring involved integrating educational institutions into a larger cybernetic system. Now I can show what I meant by that.

Consider the introduction of site-based management, one popular component of restructuring. This is a form of limited autonomy. And in some contexts, wonderful opportunities might come of it. But by and large, in the current climate of increased demands on schools, shrinking resources, and greater business involvement, it will most often put local actors in the role of overseeing their school's accommodation to external pressures. Exactly *how* the school cuts costs, or supplies the local labor market, or promotes "us" at the expense of "them," is the prerogative of the site-based managers, but *that* it will do so is not really in question. Just see what happens if the site managers decide to abolish standardized tests, or adopt heterogeneous grouping, or devote all their resources to arts programs. As with the other cybernetic control mechanisms mentioned, there is increased latitude regarding the details of performing a given mission, but only in the interest of greater efficiency in the completion of that mission.

A related example is provided by my own institution, the University of Wisconsin-Madison. We are in the midst of planning for something called "Quality Reinvestment." That's a euphemism for choosing which programs to target for elimination in the likely event of budget cuts - cuts made even more likely by a policy of reducing student enrollment. The way it works is each department sends representatives to a committee charged with deciding how to make cuts in its portion of the university. The committee has no say over the total amount of funding that would be cut within its area, only over how to distribute the pain. The agenda, the size of the cuts, has been set at the top, and the local

managers have just enough autonomy to choose *which* programs are of sufficient quality to justify continued investment. The terminology isn't the only thing about it that resembles corporate thinking. It's intended to create a leaner, meaner firm, through selling off unproductive assets (i.e., departments that don't attract research money), and abandoning less lucrative customers (i.e., high school graduates with lower GPAs).

So that's what cybernetics looks like in educational institutions: adherence to handed-down goals through self-imposed measures. But what about cyborgs - does their hybrid nature free them from the constraints of their cybernetic ancestry? Maybe. We'll have to see. But another recent film release suggests pessimism here, as well.

Ridley Scott's film "Blade Runner," based on the Philip K. Dick novel *Do Androids Dream of Electric Sheep?*, is now available in a new cut. The setting is a dystopic near-future Los Angeles, characterized by an enormous gulf between a relative few living in protected high-tech luxury, and the neglected remainder, living in a semi-chaos saturated with incessant advertisements promising escape and oblivion. The story concerns "replicants," manufactured life forms barely distinguishable from humans, designed to perform useful services but displaying an occasional penchant for insurrection. I think the replicants qualify as cyborgs. They are human in their appearance and emotional responses; they are cybernetic in having preprogrammed goals and implanted memories; and their dangerous unpredictability is quintessentially cyborg. Two pivotal characters in the film are Rachel, a replicant who had been led to believe she was human, and discovers early in the narrative that she is not, and Deckard, a law enforcement official commissioned to hunt down and "retire" renegade replicants. Deckard displays little enthusiasm, apparently having tired of life as a hired gun, and once pressured into accepting his current assignment, is grimly efficient as he inexorably tracks down his targets. He is, however, touched by Rachel's trauma, and the two establish an illicit relationship. (Any optimism over the state of gender relations in the world to come is undermined by the fact that their "romance" is proclaimed by an act of what can only be described as sexual assault.) The final scene of the recut version strongly suggests that Deckard is himself a replicant, even though we have assumed throughout that he was human, as apparently did he.

Now it seems to me that despite his cyborg nature, Deckard's life is by no means characterized by unpredictability and transgression. The cybernetic quality of self-sufficiently pursuing goals set by others predominates. Worse yet, even under the presumption that Deckard was human, and had not been mechanically preprogrammed to assassinate replicants, it wouldn't have mattered - he was still just as trapped, just as lacking in options. I don't know which is more unsettling, the suggestion that none of us can be sure we're not machines instructed to believe we're human, or the suggestion that it'd make no difference if we were. I should also point out that in the world of "Blade Runner," no one is at the top of this hierarchy, running the whole system. It more or less runs itself. The head of the company that manufactures replicants is the one person who might plausibly be "in charge," and even when he is killed, there is no sign anything will change.

In this setting, power operates much as in the panopticon discussed by Foucault (and the classroom equivalent considered in Matthew's paper, the "panaudicon"). Direct, top-down control is rarely exercised. Instead the social and technical environment itself shapes behavior such that individuals come to regulate themselves. It's all very cybernetic. It looks to me a lot like site-based management, and UW's "Quality Reinvestment," and the increasingly popular management tool of "quality circles," in which workers are recruited to supervise themselves. All of these phenomena can be viewed, I think, as part of a broad trend towards internalized forms of social control. As the designers of anti-aircraft

guns and power distribution grids have long known, a bit of autonomous self-regulation, within carefully constrained domains, goes a long way toward making a system stable, predictable, and generally easy to manage. It works not just for control of mechanical systems, but social ones as well.

Where else is this trend evident? Here are a few quick examples. Twenty years ago, Basil Bernstein analyzed what he called "invisible pedagogy," a child-centered pedagogy common in English primary schools, aspects of which are certainly present in contemporary U.S. schools. This pedagogy is much less directive than traditional teaching. On the surface, students appear free to decide what to do, when to do it, and how good is good enough. There are said to be no "right" answers. Upon closer inspection, however, it turns out that there *are* criteria for adequate progress; they're just implicit. In order to be considered ready to proceed on to the next level, a student must "spontaneously" manifest appropriate interests. Since the signs of readiness are known only to the teacher, the child cannot deliberately choose to exhibit them in an effort to satisfy the teacher. That sort of manipulation is impossible without knowing what the teacher is looking for, so the signs of readiness can be exhibited only when the child has actually developed the authorized interests. In effect, the child ends up regulating his/her own subjectivity in line with teacher expectations, without direct control ever being exercised.

A second example comes from Susan Bordo's writing about our society's preoccupation with slenderness in female bodies. She suggests the currently enforced ideal has less to do with thinness, per se, than with the degree of firmness, the extent to which the body is under control. Muscular bulk is okay, and even promoted in certain contexts, but bodily excess, out-of-control bulges, are absolutely prohibited. Fleshiness is seen as reflecting moral and spiritual inadequacy, a lack of self-control. Extreme forms of self-regulation again arise under such a regime.

Male subjectivity also involves internalized forms of social control. The hierarchies of corporate and military organizations are largely sustained by rungs upon rungs of men who are living out a particular, class-linked notion of what it means to be male: more than anything else, for this class stratum, it means self-regulation. At all levels of management, it means internalizing the norms of the organization, and acting autonomously to safeguard its interests within one's area of responsibility. These complex systems are managed most efficiently and stably, again, not by direct, top-down imposition, but via internalized forms of social control - via cybernetics, essentially.

As David Shutkin mentions, the discourse of school restructuring merges the languages of information technology and social management. The examples I've just provided suggest that merger may be redundant, as the language of information technology, the language of cybernetics, already is, and has always been, a language of social management. Certainly these examples of social management do not depend on, and in fact predate, new information technologies. Nonetheless, the continued spread of technologies based on principles of self-regulation may well facilitate the further colonization of our institutions by these same principles. So what should we expect from the computerization of schools, from the cyborgization of students? If prevailing trends continue, it may be grim: more self-regulation, more homogenization, more integration into a global cybernetic system, are all entirely possible.

I realize I've been offering an extremely pessimistic, and rather one-sided, view. I am, in fact, rather surprised at the position I've taken - what I've said here is in important ways completely contrary to things I've said elsewhere. In this paper I have, for instance, thoroughly neglected the openings also created by the new technologies, the oppositional cultures that do exist in pockets and do find ways to reappropriate the artifacts and symbols of the information age. I've implied the prevalence of passive victimization. I've embraced economistic arguments, disregarding the tangled processes by which people

make meaning from the material world.

I still believe that stuff happens, and is important. It's just that I'm wary of assuming there's anything automatic or assured about counterhegemonic responses. They only happen when and where someone makes them happen. Even when someone tries, the outcome is not guaranteed, and I don't think the odds are particularly good just now.

I fear complacence among progressive thinkers concerned with technology. Envisioning the radical possibilities inherent in new developments is crucial, but who's going to make those dreams come true? By itself, technology will not save us. No more than it "saved" those five Turkish sailors a few days ago.

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